WAG 9

APPENDIX H

ANL-W GROUNDWATER SAMPLE RESULTS

for OPERABLE UNIT 9-04: COMPREHENSIVE RI/FS FINAL WORK PLAN



Prepared By Argonne National Laboratory-West Data Limitations and Validation Report Lockheed Idaho Technologies SDG 93111107

Argonne National Laboratory - West Semivolatile Organic Compounds One Aqueous Sample

Validated by:

Data Validator

Approved by:

Data Validation Quality

Assurance Officer

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1.0 INTRODUCTION

The Argonne National Laboratory - West sample set for Case No.93111107, SDG 93111107 consists of one aqueous sample analyzed for Target Compound List (TCL) semivolatile organic compounds. All analyses were conducted using SW-846 Method 8270 analytical and reporting protocols. The analyses were performed by the Biospherics Laboratory using the protocols outlined in the ANL-West SOW. The data were reported as a Level IV analysis. A Level A validation was performed on the samples in this SDG. A total of 64 sample data points were reported in this analytical data set.

The analytical data from these analyses were reviewed by HALLIBURTON NUS Corporation personnel in accordance with ERP Standard Operating Procedure SMO-SOP-12.1.3.

2.0 QUALITY CONTROL SUMMARY

The data were evaluated based on the following parameters:

Data Completeness
Holding Times
GC/MS Tuning and Mass Calibration
Initial and Continuing Calibrations

- Blank Analyses
- Surrogate Spike Recoveries
 Blank Spike Results
 Internal Standards Performance
- * System Performance and Detection Limits
- * Compound Identification
- Compound Quantitation

The asterisk indicates that all quality control criteria were met for this parameter. Problem areas affecting data usability are discussed in Section 4.0 of this report. A Glossary of Data Validation Flags which defines the validation qualifiers applied on a sample-specific basis is presented in Section 6.0.

3.0 DATA COMPLETENESS

The data presented in Case No. 93111107, SDG 93111107 consists of semivolatile organic results for one (1) aqueous sample as follows:

ANL-260-93-4(93111107-10)

The data package was incomplete as submitted. Chain of custody forms were not provided. Initial calibration Form VIs and their corresponding DFTPP Form Vs were not contained in the data package. Presentation and documentation of the data package deliverables were extremely poor. The data package does not conform to a Level A deliverable. Notable omissions of forms include: an incorrectly transcribed Form V from 11/18/93, incorrect Form IIs, and an incorrect Form VIII.

4.0 SUMMARY OF DATA USABILITY

It should be noted that a chain of custody form for the sample contained in this SDG was not provided. However, an Analysis Bench Sheet was provided with the date of sample collection. The sample was extracted grossly outside of the semivolatile 7 day holding time. As a result of this gross exceedence nondetected results were considered unreliable and were rejected, (R), in the affected sample.

The DFTPP tuning Form V from 11/18/93 contained Percent Relative Abundance information which was incorrect. Based on the raw data, the data reviewer has amended the appropriate forms. No further action was taken.

A continuing calibration Percent Difference (%D) greater than 50% was reported for benzo(g,h,i)perylene. Positive and nondetected results are affected by this noncompliance. No action was taken, however, since the nondetected result for this compound was qualified for a more severe noncompliance.

Continuing calibration %Ds greater than 25% were reported for bis(2-chloroethoxy)methane, indeno(1,2,3-cd)pyrene and dibenz(a,h)anthracene. Positive results only are affected by these noncompliances. No action was taken since no positive results were reported.

It should be noted that the laboratory failed to report Percent Recoveries (%Rs) correctly on the surrogate recovery Form II for the sample contained in this SDG. A preliminary surrogate report was available for this sample which reported the correct information. The data reviewer has amended Form II. All %Rs for the surrogates were within quality control limits.

High %Rs were reported for N-nitroso-di-n-propylamine and 2,4-dinitrotoluene in the blank spike sample. No action was taken since no positive results were reported for these compounds in the affected sample and nondetected results are not compromised by this noncompliance.

It should be noted that the laboratory reported the 12 hour internal standard areas both upper and lower limits, for all six semivolatile internal standards incorrectly. Based on the raw data, the data reviewer has amended the appropriate forms. All internal standard areas were compliant.

Annotated laboratory Form I data summary reports showing the data and relevant qualifier flags applied are presented in Appendix A of this report. Copies of the unqualified data summary reports as reported by the laboratory are provided in the attached Appendix B. The attached Appendix C includes documentation to support the findings discussed in this report.

TABLE 1

LOCKHEED IDAHO TECHNOLOGIES

Case No. 93111107, SDG 93111107

SEMIVOLATILE ORGANIC COMPOUNDS

Sample No.	Qualifier Flags
ANL-260-93-4(93111107-10)	R ¹

*See Section 6.0 Glossary of Data Validation Flags for qualifier flag definitions.

A sample-specific summary of the data validation flags applied is depicted in Table 1, appearing on the previous page. The qualifier flags used as a result of the validation process are defined in Section 6.0 (Glossary of Data Validation Flags) of this report. Details regarding the application of the validation qualifiers are discussed in the remainder of this section.

4.1 Holding Times

It should be noted that a chain of custody form for the sample contained in this SDG was not provided. However, an Analysis Bench Sheet was provided with the date of sample collection. The sample was extracted grossly outside of the semivolatile 7 day holding time. As a result of this gross exceedence nondetected results were considered unreliable and were rejected, (R), in the affected sample.

4.2 GC/MS Tuning

The DFTPP tuning Form V from 11/18/93 contained Percent Relative Abundance information which was incorrect. Based on the raw data, the data reviewer has amended the appropriate forms. No further action was taken.

4.3 Calibrations

The continuing calibration performed on instrument GC/MS: B (11/18/93) at 08:48 contained the following %D which failed to meet the 50% quality control criterion:

Compound		<u>%D</u>
Benzo(g,h,i)perylene		58.1
Affected Sample	ANI -260-93-4	

Positive and nondetected results are affected by this noncompliance. No action was taken, however, since the nondetected result for this compound was qualified for a more severe noncompliance.

The continuing calibration performed on instrument GC/MS: B (11/18/93) at 08:48 contained the following %Ds which failed to meet the 25% quality control criterion:

Compound	<u>%D</u>
Bis(2-chloroethoxy)methane	27.9
Indeno(1,2,3-cd)pyrene	32.4
Dibenz(a,h)anthracene	36.6

Affected Sample: ANL-260-93-4

Positive results only are affected by these noncompliances. No action was taken since no positive results were reported.

4.4 Surrogate Recoveries

It should be noted that the laboratory failed to report Percent Recoveries (%Rs) correctly on the surrogate recovery Form II for the sample contained in this SDG. A preliminary surrogate report was available for this sample which reported the correct information. The data reviewer has amended Form II. All %Rs for the surrogates were within quality control limits.

4.5 Blank Spike Results

High %Rs were reported for N-nitroso-di-n-propylamine and 2,4-dinitrotoluene in the blank spike sample. No action was taken since no positive results were reported for these compounds in the affected sample and nondetected results are not compromised by this noncompliance.

4.6 Internal Standard Areas

It should be noted that the laboratory reported the 12 hour internal standard areas, both upper and lower limits, for all six semivolatile internal standards incorrectly. Based on the raw data, the data reviewer has amended the appropriate forms. All internal standard areas were compliant.

4.7 Additional Comments

It should be noted that the detection limits on the laboratory Form Is may be incorrect. The detection limits may be low by a factor of two since only 500 ml were extracted instead of the method indicated amount of 1000 ml.

5.0 SUMMARY OF LABORATORY PERFORMANCE

Chain of custody forms and laboratory Form Vs and VIs were not contained in the data package. Sample ANL-260-93-4 was extracted grossly outside of the semivolatile 7 day holding time. The laboratory Form V from 11/18/93 was incorrectly reported. A continuing calibration %D greater than 50% was reported for benzo(g,h,i)perylene. Continuing calibration %Ds greater than 25% were reported for bis(2-chloroethoxy)methane, indeno(1,2,3-cd)pyrene and dibenz(a,h)anthracene. The laboratory failed to report %Rs correctly on the surrogate recovery Form II for the sample contained in this SDG. High %Rs were reported for N-nitroso-di-n-propylamine and 2,4-dinitrotoluene in the blank spike sample. The laboratory reported the 12 hour internal standard areas, both upper and lower limits, for all six semivolatile internal standards incorrectly.

6.0 GLOSSARY OF DATA VALIDATION FLAGS

The following data validation flags were applied to the sample data for reasons detailed previously in this report:

R¹ - Reject, (R), nondetected results as a result of a gross holding time exceedence.

7.0 REFERENCES

The data referenced in this report were validated in accordance with the protocols outlined in ERP Standard Operating Procedure SMO-SOP-12.1.3 as presented in ERP-SOW-37. In addition, details stipulating laboratory procedures as outlined in the ANL-West SOW were referenced.

APPENDIX A QUALIFIED LABORATORY RESULTS

1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

Lab Name: BIOSPHER	cs		Contract:	ARGONNE NAT LAB	ANL-260-93-4	
Lab Code: 93111107	Case No.:		SAS No.:		SDG No	
Matrix: (soil/water)	WATER	•		Lab Sample ID:	93111107-10	
Sample wt/vol:	500	(g/mL)	mL	Lab File ID:	>CH289::Z3	
Level: (low/med)	LOW	•		Date Received:	10/13/93	
% Moisture: 0	decan	ted: (Y/N)	<u> </u>	Date Extracted:	11/12/93	
Concentrated Extract	Volume:	1000	_ (uL)	Date Analyzed:	11/18/93	
Injection Volume:	1	(uL)		Dilution Factor:	1	
GPC Cleanup: (Y/N)	N	pH:		-		NE
			CONCENTRAT	ION UNITS:		$\sim \sim$
CAS NO.	COMPOUND		(ug/L or u		ug/L	_ 3
108-95-2	Phenol			1		10 # R
111-44-4	bis (2-Chl	oroethyl)	ether			10
195-57-8	2-Chloropi	henol		1		10
541-73-1	1,3-Dichle		e	·		10!
1106-46-7	1,4-Dichle					10
95-50-1	1,2-Dichle	orobenzen	e			10:
95-48-7	2-Methylp	henol				10.0
108-60-1			ropropane)			NR
106-44-5	4-Methylpl	henol				LOIN R
	N-Nitroso		pylamine			10:0
167-72-1						LOIS
98-95-3	Nitrobenze	ene				0.0
78-59-1	Isophorone	•				LOID
88-75-5	2-Nitrophe	enol				10 0
105-67-9						00
111-91-1	bis(2-Chlo) methane	 		o, u
120-83-2	2,4-Dichle				5	00
120-82-1	1,2,4-Trie	chloroben:	zene			OU
91-20-3	Naphthaler	ne				0.0
106-47-8	4-Chloroan	niline		 		010
87-68-3	Hexachlore					0.0
159-50-7	4-Chloro-3	3-methylp	nenol			0.0
91-57-6	2-Methylna			1		0:0
177-47-4	Hexachlor	cyclopent	tadiene			010
88-06-2	2,4,6-Tri			1		0.0
!95-95 -4- - -	2,4,5-Tric					OIU
91-58-7	2-Chlorona		•	,		0.0
188-74-4	2-Nitroan					010
131-11-3	Dimethylph					0.0
208-96-8	Acenaphthy					0.0
606-20-2	2,6-Dinit					0.0
99-09-2	3-Nitroani					0 0
83-32-9 <u></u>	Acenaphthe	ene				oit V
						i

Lab Name: BIOSPHERI Lab Code: 93111107 Matrix: (soil/water) Sample wt/vol: Level: (low/med) Moisture: 0 Concentrated Extract Injection Volume: GPC Cleanup: (Y/N)	Case No.: WATER 500 LOW decan	(g/mL) - ated:(Y/N) 1000	SAS No.:	Lab Sample ID: Lab File ID: Date Received:	SDG 1 93111107-10 >CH289::Z3 10/13/93 11/12/93 11/18/93	No.:		
Matrix: (soil/water) Sample wt/vol: Level: (low/med) Moisture: 0 Concentrated Extract Injection Volume:	WATER 500 LOW decan Volume:	(g/mL) ited: (Y/N) 1000 (uL)	mL N (uL)	Lab Sample ID: Lab File ID: Date Received: Date Extracted: Date Analyzed:	93111107-10 >CH289::Z3 10/13/93 11/12/93 11/18/93			-
Sample wt/vol: Level: (low/med) % Moisture: 0 Concentrated Extract Injection Volume:	500 LOW decan Volume:	1000 (uL)	N (uL)	Lab File ID: Date Received: Date Extracted: Date Analyzed:	>CH289::Z3 10/13/93 11/12/93 11/18/93			
Level: (low/med) * Moisture: 0 Concentrated Extract Injection Volume:	LOW decan Volume:	1000 (uL)	N (uL)	Date Received: Date Extracted: Date Analyzed:	10/13/93 11/12/93 11/18/93			
% Moisture: 0 Concentrated Extract Injection Volume:	decan	1000 (uL)	(uL)	Date Extracted: Date Analyzed:	11/12/93			
Concentrated Extract Injection Volume:	Volume:	1000 (uL)	(uL)	Date Analyzed:	11/18/93			
Injection Volume:	•	(uL)	•	-				
•	1	•		Dilution Factor:	1			
GPC Cleanup: (Y/N)	*	pH:						
						ין	UB	,
CAS NO.	COMPOUND		CONCENTRATI		ug/L	<i>→</i> 	11.B 3/1.9	, 1
101-55-3	4-Nitrophe Dibenzofur 2,4-Dinitr Diethylpht 4-chloroph Fluorene 4-Nitroani 4,6-Dinitr N-Nitrosod 1-Bromophe Mexachloro Centach	enol ran rotoluene thalate henyl-phen iline ro-2-methy iiphenylam enyl-pheny bbenzene rophenol ene ilphthalate orobenzidi thracene lhexyl)pht phthalate uoranthene uoranthene	lphenol ine (1) lether			10 V		

Data Limitations and Validation Report Lockheed Idaho Technologies

SDG 93102505

Argonne National Laboratory - West

Semivolatile Organic Compounds

Two Aqueous Samples

Validated by:

Anne K. Battista

Data Validator

Approved by:

Joseph A. Samchuck Data Validation Quality

Assurance Officer

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1.0 INTRODUCTION

The Argonne National Laboratory - West sample set for Case No., SDG 93102505 consists of two aqueous samples analyzed for Target Compound List (TCL) semivolatile organic compounds. All analyses were conducted using SW-846 Method 8270 analytical and reporting protocols. The analyses were performed by the Biospherics Laboratory using the protocols outlined in the ANL-West SOW. The data were reported as a Level IV analysis. A Level A validation review was performed on the samples in this SDG. A total of 128 sample data points were reported in this analytical data set.

The analytical data from these analyses were reviewed by HALLIBURTON NUS Corporation personnel in accordance with ERP Standard Operating Procedure SMO-SOP-12.1.3.

2.0 QUALITY CONTROL SUMMARY

The data were evaluated based on the following parameters:

- Data Completeness
- Holding Times
 GC/MS Tuning and Mass Calibration
 Initial and Continuing Calibrations
- * Blank Analyses
- Surrogate Spike Recoveries
 Matrix Spike/Matrix Spike Duplicate Results
 Internal Standards Performance
 System Performance and Detection Limits
- Compound Identification
- * Compound Quantitation

The asterisk indicates that all quality control criteria were met for this parameter. Problem areas affecting data usability are discussed in Section 4.0 of this report. A Glossary of Data Validation Flags which defines the validation qualifiers applied on a sample-specific basis is presented in Section 6.0.

3.0 DATA COMPLETENESS

The data presented in Case No. 93102505, SDG 93102505 consists of semivolatile organic results for two (2) aqueous samples as follows:

ANL-226-93-4(93102505-17)

ANL-239-93-3(93102505-19)

The data package was incomplete as submitted. Chain of custody forms were not provided. An initial calibration Form VI and the corresponding DFTPP Form V, were not contained in the data package. Presentation and documentation of the data package deliverables were extremely poor. The data package does not conform to a Level A deliverable. Laboratory Form IIs, IVs, Vs and VIIIs were not fully completed and in some cases incorrectly completed.

4.0 SUMMARY OF DATA USABILITY

It should be noted that a chain of custody form for the sample contained in this SDG was not provided. However, an Analysis Bench Sheet was provided with the date of sample collection. The sample was extracted and analyzed with the semivolatile holding requirements. No further action was taken.

The DFTPP Form V from 11/01/93 was not filled out correctly. A Percent Relative Abundance was incorrectly transcribed. Based on the raw data, the data reviewer has amended the appropriate form.

Initial calibration information from 10/29/93 was omitted from the data package. Therefore, it is not possible to assess data quality for this parameter.

The continuing calibration Form VII from 11/01/93 correctly recorded. Copies of this calibration contained in the data package were illegible. Continuing calibration Percent Differences (%Ds) greater than 25% were reported for 4-nitrophenol, di-n-butylphthalate, fluoranthene, pyrene, 3,3-dichlorobenzidine, benzo(k)fluoranthene and benzo(a)pyrene. Positive results only are affected by these noncompliances. No action was taken since no positive results were reported for the aforementioned compounds in the affected samples.

It should be noted that the Blank Summary Form IVs were incorrectly reported.

It should be noted that the laboratory failed to report Percent Recoveries (%Rs) on the surrogate recovery Form II for the samples contained in this SDG. Also, the matrix spike and blank spike samples have incorrect recoveries reported on the Form II. A preliminary surrogate report was available for the samples which reported the correct information. The data reviewer has amended the Form II. All %Rs for the surrogates were within quality control limits.

It should be noted that the laboratory failed to report the areas of all six semivolatile internal standards for the samples contained in this SDG. An internal standard check report was provided in the raw data for each sample. Therefore, the data reviewer has amended the appropriate forms.

Annotated laboratory Form I data summary reports showing the data and relevant qualifier flags applied are presented in Appendix A of this report. Copies of the unqualified data summary reports as reported by the laboratory are provided in the attached Appendix B. The attached Appendix C includes documentation to support the findings discussed in this report.

TABLE 1

LOCKHEED IDAHO TECHNOLOGIES

Case No. 93102505, SDG 93102505

SEMIVOLATILE ORGANIC COMPOUNDS

Sample No.	Qualifie
ANL-226-93-4(93102505-17)	
7 (14L LLO 00 4(00102000 11)	

* See Section 6.0 Glossary of Data Validation Flags for qualifier flag definitions.

A sample-specific summary of the data validation flags applied is depicted in Table 1, appearing on the previous page. The qualifier flags used as a result of the validation process are defined in Section 6.0 (Glossary of Data Validation Flags) of this report. Details regarding the application of the validation qualifiers are discussed in the remainder of this section.

4.1 Holding Times

It should be noted that a chain of custody form for the sample contained in this SDG was not provided. However, an Analysis Bench Sheet was provided with the date of sample collection. The samples were extracted and analyzed within the semivolatile holding requirements. No further action was taken.

4.2 GC/MS Tuning

The DFTPP Form V from 11/01/93 was not filled out correctly. A Percent Relative Abundance was incorrectly transcribed. Based on the raw data, the data reviewer has amended the appropriate form.

4.3 Calibrations

Initial calibration information from 10/29/93 was omitted from the data package. Therefore, it is not possible to assess data quality for this parameter.

The continuing calibration performed on instrument GC/MS: B (11/01/93) at 11:45 contained the following %Ds which failed to meet the 25% quality control criterion:

Compound	<u>%D</u>
4-Nitrophenol	31.1
Di-n-butylphthalate	25.6
Fluoranthene	28.9
Pyrene	30.8
3,3'-Dichlorobenzidine	27.7
Benzo(k)fluoroanthene	28.7
Benzo(a)pyrene	27.9

Affected Sample: ANL-226-93-4(93102505-15), ANL-239-93-3(93102505-19)

Positive results only are affected by these noncompliances. No action was taken since no positive results were reported.

4.4 Surrogate Recoveries

It should be noted that the laboratory failed to report %Rs on the surrogate recovery Form II for the samples contained in this SDG. Also, the matrix spike and blank spike samples have incorrect recoveries reported on the Form II. A preliminary surrogate report was available for the samples which reported the correct information. The data reviewer has amended the Form II. All %Rs for the surrogates were within quality control limits.

4.5 Internal Standard Areas

It should be noted that the laboratory failed to report the areas of all six semivolatile internal standards for the samples contained in this SDG. An internal standard check report was provided in the raw data for each sample. Therefore, the data reviewer has amended the appropriate forms.

4.6 Additional Comments

It should be noted that the detection limits on the laboratory Form Is may be incorrect. The detection limits may be low by a factor of two since only 500 ml were extracted instead of the method indicated amount of 1000 ml.

5.0 SUMMARY OF LABORATORY PERFORMANCE

Chain of custody forms and laboratory Form Vs and VIs were not contained in the data package. Continuing calibration %Ds greater than 25% were reported for several compounds. The laboratory failed to report %Rs on the surrogate recovery Form II for the samples contained in this SDG. Also, the matrix spike and blank spike samples have incorrect recoveries reported on the Form II. It should be noted that the laboratory failed to report the areas of all six semivolatile internal standards for the samples contained in this SDG.

6.0 GLOSSARY OF DATA VALIDATION FLAGS

The following data validation flags were applied to the sample data for reasons detailed previously in this report:

The data were accepted without qualification.

7.0 REFERENCES

The data referenced in this report were validated in accordance with the protocols outlined in ERP Standard Operating Procedure SMO-SOP-12.1.3 as presented in ERP-SOW-37. In addition, details stipulating laboratory procedures as outlined in the ANL-West SOW were referenced.

APPENDIX A

QUALIFIED LABORATORY RESULTS

	SEMIVO	LATILE ORG	1B ANICS ANA	LYSIS DATA	SHEET	SAMPLE NUMBER	
Lab Name:	BIOSPHERI	rcs		Contract:	ARGONNE NAT LAB	ANL-226-93-4	
Lab Code:	93102505	_Case No.:		SAS No.:	***************************************	SDG No.:	
Matrix: (so	il/water)	WATER			Lab Sample ID:	93102505-15	_
Sample wt/v	ol:	500	(g/mL)	ML	Lab File ID:	>CH144::Z2	_
Level: (low	/med)	LOW			Date Received:	10/25/93	
% Moisture:	0	decan	ted: (Y/N)	N	Date Extracted:	10.37.93	_
Concentrate	d Extract	Volume:	1000	(uL)	Date Analyzed:	11/01/93	_
Injection V	olume:	1	(uL)		Dilution Factor:		-
GPC Cleanup	: (Y/N)	и	pH:			inche in the	I
CAS NO.		COMPOUND		CONCENTRAT		ug/L	Q
108-95-2		Phenol			10		י ני
111-44-4			oroethyl)	ether	10	······································	Ū
195-57-8					10		Ü
1541-73-1				e	10		ŢŪ
106-46-7					10		ıU
195-50-1					10		ŢŪ.
195-48-7				_	10		10
108-60-1	. <u>-</u>	2.2'-nxvb	is(l-Chlo	ropropanel			NR
1106-44-5		4-Methyln	henol		10		IU
621-64-7				nvlamine	10		.U
167-72-1		Hevachlor	nethane	pyramane	10		10
98-95-3-					10		ָ ['] U
178-59-1					10	 	TU TU
88-75-5		2-Nitroph	enol		10		įυ
1105-67-9	and the second s	2.4-Dimet	hvlphenol		10		าับ
111-91-1	. 	bis(2-Chl) methane	10		įŪ
120-83-2					50		<u>ַדַּ</u>
120-82-1		1,2,4-Tri	chloroben	zene	10		ıU
91-20-3					10		יַּט
106-47-8		4-Chloroa			50		ίŪ
137-68-3		Hexachlor	obutadien	e	10		ប
59-50-7		4-Chloro-	3-methylp	henol	50		ιÜ
91-57-6					10		ប
77-47-4		Hexachlor	ocyclopen	tadi e ne	10		ĮŪ.
88-06-2	- - -	2,4,6-Tri	chlorophe	nol	10		ប
95-95-4		2,4,5-Tri	chlorophe	nol	10		10
91-58-7	- -	2-Chloron	aphthalen	e '	10		ับ
133-74-4					10		ប :ប
131-11-3-	- -	Dimethylp	nthalate		10		iu
208-96-8-					10		ָ ^{יַט}
606-20-2-				:	10		10
99-09-2					50		Ü
33-32-9		· Acenaphth	ene		10	· ·	I ^U

 $\| \widehat{\mathbf{y}}_{i,j}^{(n)} \|_{\mathcal{H}_{p,n}}^{2n} \leq \frac{1}{n} \sum_{i=1}^{n} \frac{\mathbf{y}_{i,j}^{(n)} \cdot \mathbf{y}_{i,j}^{(n)}}{\mathbf{y}_{i,j}^{(n)} \cdot \mathbf{y}_{i,j}^{(n)}}$

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	SEMIVO	LATILE ORG	1C ANICS ANA	LYSIS DATA		SAMPLE NUMBER	
Lab Name:	BIOSPHER					ANL-239-93-3	
Lab Code:	93102505	Case No.:		SAS No.:		SDG No.:	:
Matrix: (so		-			Lab Sample ID:	93102505-15	
Sample wt/v	ol:	500	(g/mL)	ML	Lab File ID:	>CH139::Z2	
Level: (low	/med)	LOW			Date Received:	10/25/93	
% Moisture:	0	_ decan	ted: (Y/N)	И	Date Extracted:	10-27-13	-
Concentrate	d Extract	Volume:	1000	(uL)	Date Analyzed:	11/01/93	_
Injection V	olume:	1	(uL)		Dilution Factor:	1	
GPC Cleanup	: (Y/N)	N	. рн:		- ,	April ale	
CAS NO.		COMPOUND		CONCENTRAT	ION UNITS:	ug/L	Q
51-28-5		2,4-Dinit	rophenol		50		U
100-02-7		4-Nitroph	enol		50		Tu
132-64-9					10		U U
121-14-2					10		10
84-66-2				nulathar	10		TU TU
7005-72-3-			veuAr-bue	nArscuer	10		10
186-73-7 100-01-6			iline		50		U
100-01-6 534-52-1				ylphenol	50)	i U

151-28-5 2,4-Dinitrophenol		10
1100-02-7 4-Nitrophenol	50	U
132-64-9 Dibenzofuran	10	บ
1121-14-2 2,4-Dinitrotoluene	10	Ŭ
184-66-2 Diethylphthalate	10	įŪ
17005-72-3 4-chlorophenyl-phenylether	10	ับ
186-73-7 Fluorene	10	10
100-01-6 4-Nitroaniline	50	ូប
1534-52-1 4,6-Dinitro-2-methylphenol	50	ΙÜ
86-30-6 N-Nitrosodiphenylamine (1)	10	บ
1101-55-3 4-Bromophenyl-phenylether	10	ΙÜ
118-74-1 Hexachlorobenzene	10	U
187-86-5 Pentachlorophenol	10	ΙŪ
85-01-8 Phenanthrene	10	Ŭ
1120-12-7 Anthracene	10	U
86-74-8 Carbazole		NR
184-74-2 Di-n-butylphthalate	10	U
206-44-0 Fluoranthene	10	Ü
129-00-0 Pyrene	10	U
185-68-7 Butylbenzylphthalate	10	ίŬ
191-94-1 3,3'-Dichlorobenzidine	20	ับ
156-55-3 Benzo(a) anthracene	10	10
218-01-9 Chrysene	10	ับ
1117-81-7 bis(2-Ethylhexyl)phthalate	10	ıÜ
117-84-0 Di-n-octylphthalate	10	, U
1205-99-2 Benzo(b) fluoranthene	10	ΙÜ
207-03-9 Benzo(k) fluoranthene	10	U
150-32-8 + Benzo(a)pyrene	10	ĮÜ
193-39-5 Indeno(1,2,3-cd)pyrene	10	U
153-70-3 Dibenz(a,h)anthracene	10	IU
191-24-2 Benzo(g,h,i)perylene	10	Ü
- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1		

^{(1) -} Cannot be separated from Diphenylamine

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SAMPLE NUMBER SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET ANL-239-93-3 Lab Name: BIOSPHERICS Contract: ARGONNE NAT LAB Lab Code: 93102505 Case No.: SAS No.: SDG No.: Lab Sample ID: 93102505-19 Matrix: (soil/water) WATER Sample wt/vol: 500 (g/mL) ML Lab File ID: >CH144::Z2 Level: (low/med) LOW Date Received: 10/25/93 % Moisture: 0 decanted: (Y/N) N Date Extracted: 10.27.25 Concentrated Extract Volume: 1000 (uL) Date Analyzed: 11/01/93 Dilution Factor: 1 _____ Injection Volume: 1 (uL) N pH:_____ GPC Cleanup: (Y/N) CONCENTRATION UNITS: COMPOUND CAS NO. (ug/L or ug/Kg) ug/L 108-95-2- - - - - Phenol !111-44-4- - - - - bis(2-Chloroethyl)ether 10 95-57-8- - - - - - 2-Chlorophenol 10 |541-73-1- - - - - 1,3-Dichlorobenzene 10 106-46-7- - - - - 1,4-Dichlorobenzene 10 195-50-1- - - - - - 1,2-Dichlorobenzene 10 $\tau_{\rm D}$ 195-48-7- - - - - - 2-Methylphenol 1108-60-1- - - - - 2,2'-oxybis(1-Chloropropane) 1106-44-5- - - - - 4-Methylphenol īŪ 621-64-7- - - - - N-Nitroso-di-n-propylamine 10 167-72-1- - - - - Hexachloroethane 10 ับ 10 98-95-3- - - - - - Nitrobenzene 178-59-1- - - - - - Isophorone 10 88-75-5- - - - - - 2-Nitrophenol 10 เบิ 10 111 1105-67-9- - - - - 2,4-Dimethylphenol 111-91-1- - - - - bis(2-Chloroethoxy) methane 1120-83-2- - - - - 2,4-Dichlorophenol 50 120-82-1- - - - - 1,2,4-Trichlorobenzene 10 iÜ 111 |91-20-3- - - - - - Naphthalene 10 106-47-8- - - - - 4-Chloroaniline 50 īΰ 187-68-3- - - - - - Hexachlorobutadiene 10 IJ 159-50-7- - - - - - 4-Chloro-3-methylphenol 50 ŧŪ 191-57-6- - - - - - 2-Methylnaphthalene 10 177-47-4- - - - - - Hexachlorocyclopentadiene 10 |98-06-2- - - - - - 2,4,6-Trichlorophenol 195-95-4- - - - - - 2,4,5-Trichlorophenol 10 91-58-7- - - - - - 2-Chloronaphthalene 10

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138-74-4- - - - - - 2-Nitroaniline

1208-96-8- - - - - Acenaphthylene

|99-09-2- - - - - - 3-Nitroaniline |33-32-9- - - - - - Acenaphthene

131-11-3- - - - Dimethylphthalate

606-20-2- - - - - 2,6-Dinitrotoluene

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1B SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

SAMPLE	NUMBER
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ANL-239-93-3 Lab Name: BIOSPHERICS Contract: ARGONNE NAT LAB SDG No.: 93102505 Case No.: _____ SAS No.: ____ Lab Code: Lab Sample ID: 93102505-19 Matrix: (soil/water) WATER (g/mL) ML Lab File ID: >CH144::Z2 Sample wt/vol: 500 Date Received: 10/25/93 ___LOW Level: (low/med) 3 Moisture: 0 decanted: (Y/N) N Date Extracted: 10-27-93 11/01/93 Concentrated Extract Volume: 1000 (uL) Date Analyzed: Dilution Factor: 1 Injection Volume: 1 (uL) GPC Cleanup: (Y/N) N pH: CONCENTRATION UNITS: ug/L (ug/L or ug/Kg) COMPOUND CAS NO. 108-95-2- - - - - Phenol 111-44-4- - - - - bis(2-Chloroethyl)ether 10 įŪ 10 195-57-8- - - - - - 2-Chlorophenol 1541-73-1- - - - - 1,3-Dichlorobenzene 10 106-46-7- - - - - 1,4-Dichlorobenzene ŪΤ 10 195-50-1- - - - - - 1,2-Dichlorobenzene ιÜ 10 95-48-7- - - - - - 2-Methylphenol NR 108-60-1- - - - - 2,2'-oxybis(1-Chloropropane) ıυ 10 1106-44-5- - - - - 4-Methylphenol U 10 621-64-7- - - - N-Nitroso-di-n-propylamine 10 IU 167-72-1- - - - - - Hexachloroethane 10 98-95-3- - - - - - Nitrobenzene 10 178-59-1- - - - - - Isophorone 10 88-75-5- - - - - - 2-Nitrophenol10 1105-67-9- - - - - 2,4-Dimethylphenol 10 1111-91-1- - - - - bis(2-Chloroethoxy)methane 50 1120-83-2- - - - - 2,4-Dichlorophenol 120-82-1- - - - - 1,2,4-Trichlorobenzene 10 191-20-3- - - - - - Naphthalene 50 106-47-8- - - - 4-Chloroaniline 10 87-68-3- - - - - - Hexachlorobutadiene 159-50-7- - - - - - 4-Chloro-3-methylphenol 10 191-57-6- = - - - - 2-Methylnaphthalene 10 i77-47-4- - - - - - Hexachlorocyclopentadiene 10 188-06-2- - - - - - 2,4,6-Trichlorophenol 10 195-95-4- - - - - - 2,4,5-Trichlorophenol 10 [91-58-7- - - - - 2-Chloronaphthalene 50 188-74-4- - - - - - 2-Nitroaniline 10 131-11-3- - - - - Dimethylphthalate 1208-96-8- - - - - Acenaphthylene 10 1606-20-2- - - - - 2,6-Dinitrotoluene 10 199-09-2- - - - - 3-Nitroaniline 10 83-32-9- - - - - Acenaphthene